

Machine type: 10086/3109/4743 K430  
10089/1168/4744 K410  
10090/2556/4748 K415

# Lenovo

## IdeaCentre K4 Series

### User Guide

Version 1.0 2012.02



31501096



***lenovo***

ideacentre

# Important Safety Information

Before using this manual, it is important that you read and understand all of the related safety information for this product. Refer to the *Safety and Warranty Guide* that you received with this product for the latest safety information. Reading and understanding this safety information reduces the risk of personal injury or damage to your product.



**Danger:** Be aware of extremely hazardous or lethal situations.



**Attention:** Be aware of possible damage to programs, devices, or data.



**Note:** Pay attention to this important information.

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# 1


Chapter

## Using the Computer Hardware

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### This chapter contains the following topics:

- Computer hardware introduction
- Information on computer connections

 **Note:** The descriptions in this chapter might be different from what you see on your computer, depending on the computer models and configurations.

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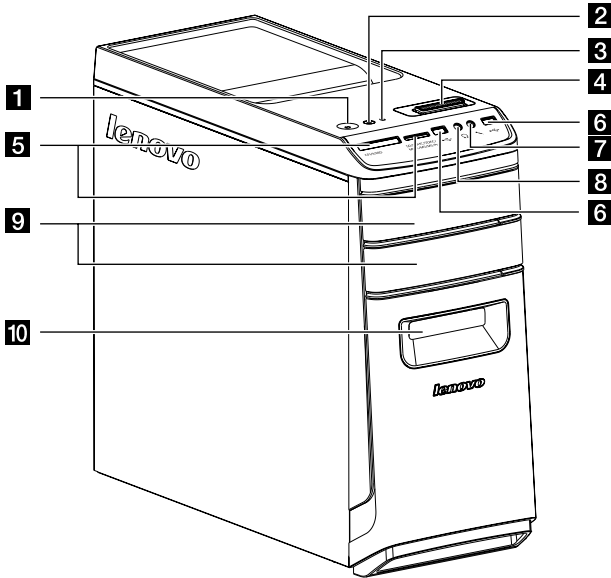
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## 1.1 Front view of the chassis



**Attention:** Be careful not to block any air vents on the computer. Blocked air vents can cause overheating.

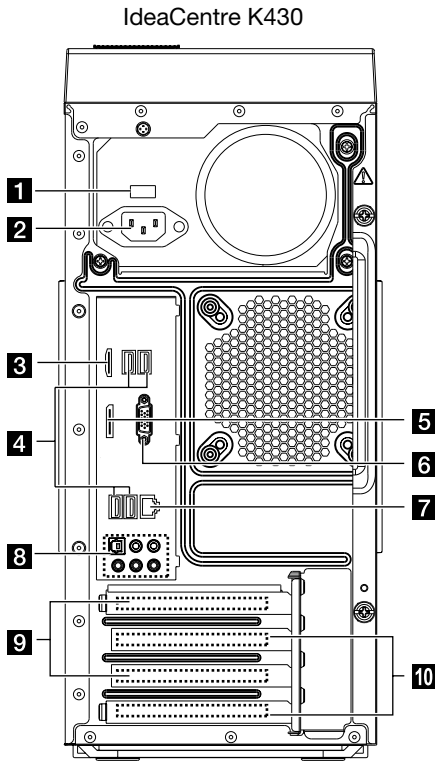


- 1** Power button
- 2** Power Control Switch indicator ON/OFF (selected models only)
- 3** Hard disk drive indicator
- 4** Power control switch (selected models only)
- 5** Memory card readers (selected models only)
- 6** USB connector
- 7** Microphone connector
- 8** Headphone connector
- 9** Optical drive (some models are equipped with only one optical drive)
- 10** Hot plug HDD port (selected models only)



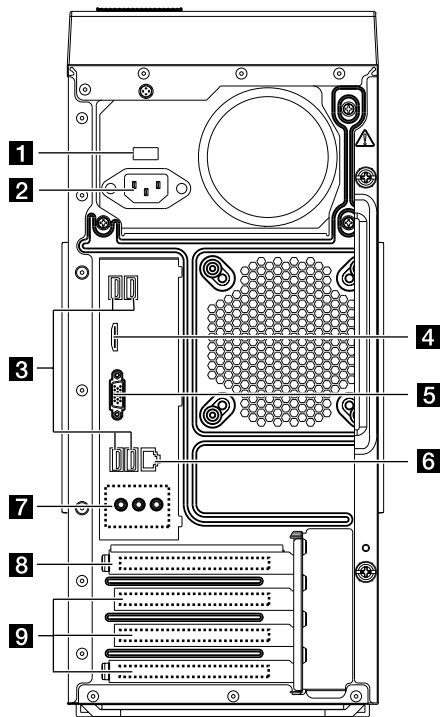
**Attention:** Do not insert 3-inch discs into the optical drive.

## 1.2 Rear view of the chassis



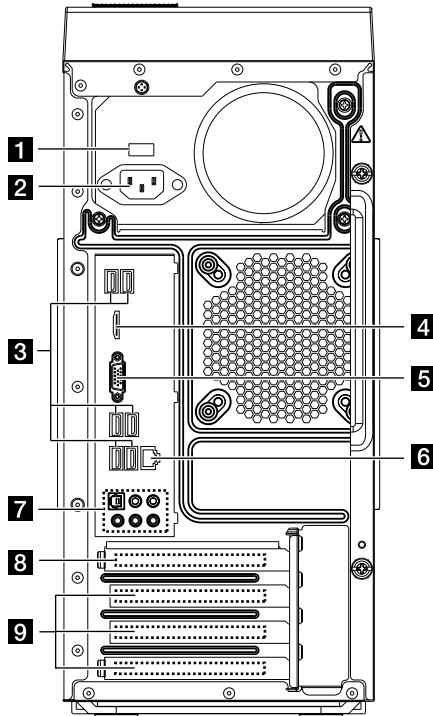
- 1** Voltage selection switch (selected models only)
- 2** Power connector
- 3** HDMI connector (selected models only)
- 4** USB connectors
- 5** DisplayPort connector (selected models only)
- 6** On-board VGA connector
- 7** Ethernet connector
- 8** Audio connectors
- 9** PCI Express X 16 graphics adapter connector (some models are equipped with a graphics card)
- 10** PCI Express X 1 adapter connector (some models are equipped with a WIFI card or TV tuner card)

## IdeaCentre K410



- 1** Voltage selection switch (selected models only)
- 2** Power connector
- 3** USB connectors
- 4** HDMI connector (selected models only)
- 5** On-board VGA connector
- 6** Ethernet connector
- 7** Audio connectors
- 8** PCI Express X 16 graphics adapter connector (some models are equipped with a graphics card)
- 9** PCI Express X 1 adapter connector (some models are equipped with a WIFI card or TV tuner card)

## IdeaCentre K415



- 1** Voltage selection switch (selected models only)
- 2** Power connector
- 3** USB connectors (USB ports 4 to 6)
- 4** HDMI connector (selected models only)
- 5** On-board VGA connector
- 6** Ethernet connector
- 7** Audio connectors
- 8** PCI Express X 16 graphics adapter connector (some models are equipped with a graphics card)
- 9** PCI Express X 1 adapter connector (some models are equipped with a WIFI card or TV tuner card)

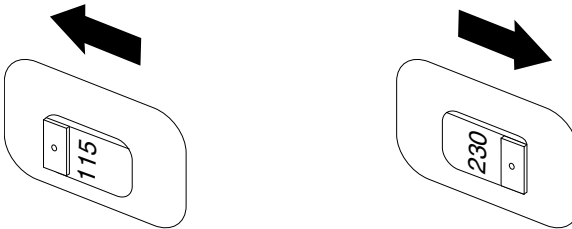
## 1.3 Connecting your computer

**!** **Note:** Your computer may not have all of the connectors described in this section.

### 1.3.1 Check the position of the voltage-selection switch on the rear of the computer. Use a ballpoint pen to slide the switch if necessary.

**!** **Note:** Some computers do not have a voltage switch. These computers control voltage automatically.


- If the voltage supply range is 100-127 V AC, set the switch to 115 V.
- If the voltage supply range is 200-240 V AC, set the switch to 230 V.



### 1.3.2 Basic connector instructions

Connector	Description
Microphone	Use this connector to attach a microphone to your computer when you want to record sound or if you use speech-recognition software.
Headphone	Use this connector to attach headphones to your computer when you want to listen to music or other sounds without disturbing anyone.
Audio line-in connector	Used to receive audio signals from an external audio device, such as a stereo system. When you attach an external audio device, a cable is connected between the audio line-out connector of the device and the audio line-in connector of the computer.

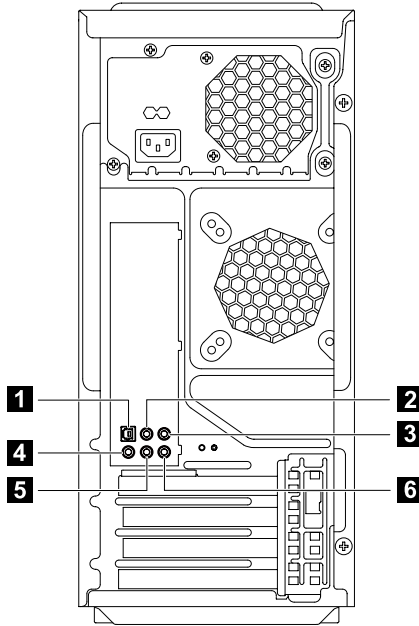
Audio line-out connector	Used to send audio signals from the computer to external devices, such as powered stereo speakers (speakers with built-in amplifiers), headphones, multimedia keyboards, or the audio line-in connector on a stereo system or other external recording device.
USB connector	Use this connector to attach a device that requires a USB connection.
Ethernet connector	Use this connector to attach the computer to an Ethernet-type local area network.
VGA connector	Used to attach a VGA monitor or other devices that use a VGA monitor connector.
DVI connector	Used to attach a DVI monitor or other devices that use a DVI monitor connector.
HDMI connector (optional)	Connects to the HDMI connector on your display or TV.
DisplayPort connector (optional)	Used to attach a high-performance monitor, a direct-drive monitor, or other devices that use a DisplayPort connector.
TV-Tuner connector (optional)	Only supported on systems with optional TV tuner card.

 **Note:** If your computer is equipped with a wireless keyboard or mouse, follow the installation instructions for those devices.



## 1.4 7.1 Audio configuration instructions

Use the following illustration when connecting a 7.1 surround sound audio system:



- |                                                  |                                     |
|--------------------------------------------------|-------------------------------------|
| <b>1</b> S/PDIF out connector                    | <b>4</b> Microphone input Connector |
| <b>2</b> Center / Low frequency output connector | <b>5</b> Audio line-out Connector   |
| <b>3</b> Surround out connector                  | <b>6</b> Audio line-in Connector    |

**!** **Note:** For more detailed settings, click **Start** → **Control panel** → **Hardware and Sound** → **Lenovo HD Audio Manager**. Follow the instructions to configure advanced settings.

### Sound configuration is as follows:

1. Right click the Sound icon in the system property bar and select the sounds option to setup the sounds in the pop-up dialog box.
2. Select a playback device from the **playback** dialog box, then click the **configure** button to configure it.
3. Select **7.1 surround** from **audio channels** in the pop-up **speaker setup** dialog box and proceed with the speaker setup by following the prompts.

4. 7.1 surround sound can be used once this configuration procedure is complete.

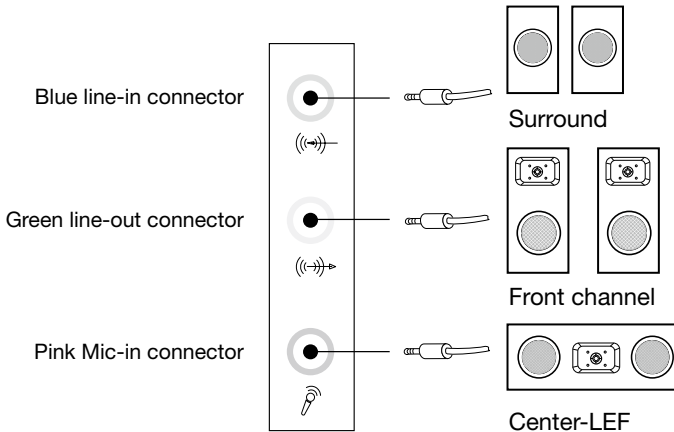
**!** **Note:** If the audio configuration interfaces above are different from those on your computer, you may use the above steps as a reference to configure the 7.1 surround sound audio device system in your actual audio configuration interface and read the electronic Help information for further assistance.

## 1.5 5.1 Audio configuration instructions

(This instruction is only for the pc model which mainboard supports audio transforming from 2.0 stereo to 5.1 surround.)

This model of computer supports transforming stereo sound into 5.1 surround sound.

Use the following guides when connecting to the 5.1 surround audio device:

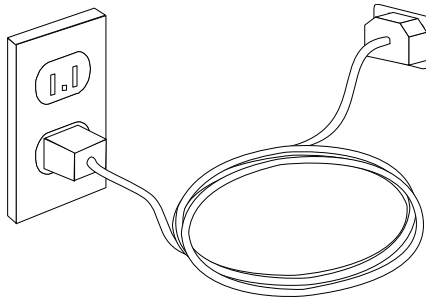


### The configurations are as followings:

1. Right click the Sound icon in system property bar and select sounds option to setup the sounds in the pop-up dialog box.
2. Select a playback device from the playback dialog box, and then click configure button to configure it.
3. Select 5.1 surround from audio channels in the pop-up speaker setup dialog box to proceed with the speaker setup by following as prompted.
4. After the configuration, 5.1 surround can be used.

**Note:** If the audio configuration interfaces in above are different from your actual computer, you may use above steps as reference to configure the 5.1 surround audio device in your actual audio configuration interface and read the electronic Help information for further assistance.

## 1.6 Connect the power cords properly to grounded electrical outlets



## 1.7 How to play Blu-ray Discs (selected models only)

Check the connectors available on your computer and display and select an appropriate cable according to this table. Because other types of cables do not meet the requirements of the Blu-ray standard.

You need to purchase the cable separately if the computer is not equipped with the corresponding cable.

This table will help you to identify the connectors on your computer and display.

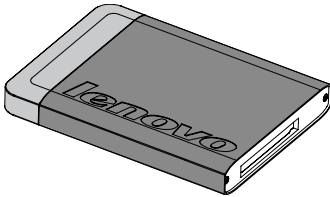
Connection Type	Computer	Cable	Display
DVI to DVI (DVI cable)			
DVI to HDMI (DVI-HDMI cable)			
HDMI to HDMI (HDMI cable)			
HDMI to DVI (HDMI-DVI cable)			

## 1.8 Wired keyboard (selected models only)

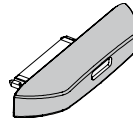
- LVT** — After entering Windows, press this key to launch the LVT (Lenovo Vantage Technology) program, Lenovo's pre-loaded Home PC software. In addition to its own functions, the LVT program will allow you to start other Windows compatible software, specially configured to run on this model of computer.
- F2** — Your computer has the Lenovo Rescue System installed. To learn more about this program, repeatedly press and release the F2 key once turning on the computer until the Lenovo Rescue System open.

## 1.9 Hot-swappable hard disk (selected models only)

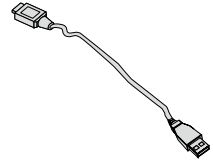
- Unpack



Hot-swappable hard disk



USB adapter

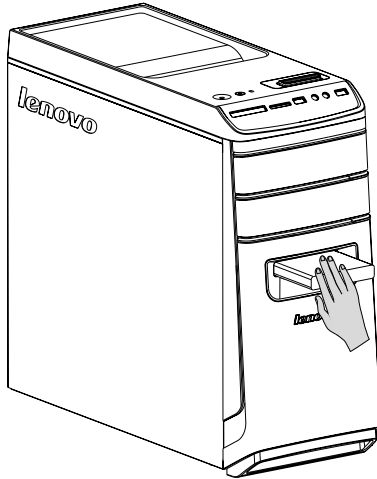


USB cable

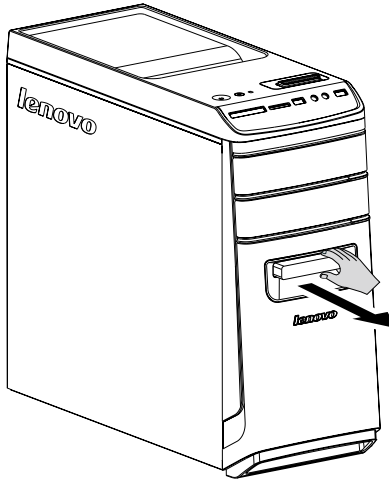
You may plug the hot-swappable hard disk conveniently while the computer system using it remains in operation, but will not damage the hard disk data. You may back up the data on this hot-swappable hard disk at any time for data maintenance or data transmission.

- Operation of the hot-swappable hard disk

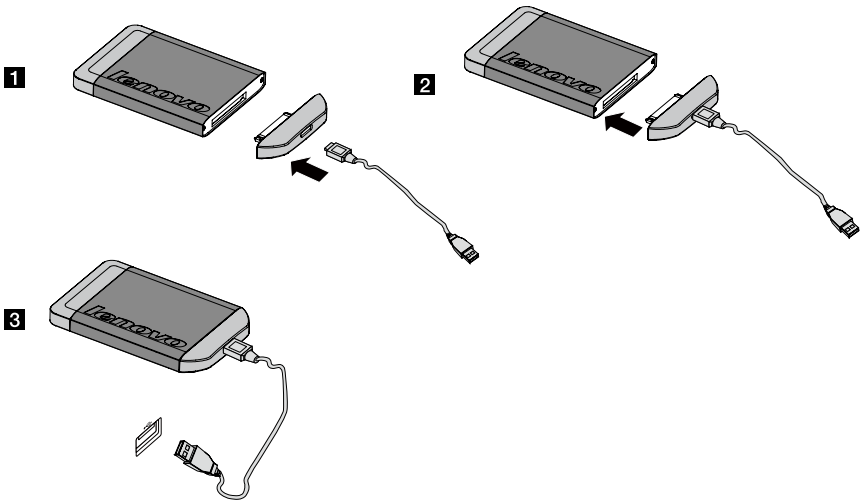
Slide it into the bay from the front until it snaps into position.



Pull the hot-swappable hard disk drive out of the drive bay.



- Connect the hot-swappable hard disk to the other computer



**!** Notes:

- Don't unplug the hard disk while it is copying the data to avoid result in a loss of data.
- After installing the hard disk and connecting all the cables, wait for a moment to make the system distinguish from the hard disk.
- Don't install the operating system on the hot-swappable hard disk.
- Don't unplug the hard disk while it is operating a software program to avoid collapse of system.
- After pulling out the hard disk, don't beat the hard disk or throw it everywhere to damage it.
- Under the Rescue System, each function mode cannot distinguish from the hot-swappable hard disk.

## 1.10 Power Control Switch (selected models only)

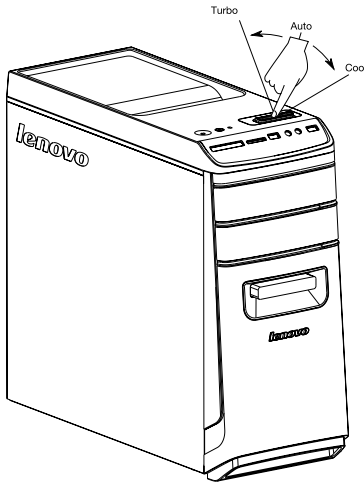
The Power Control Switch feature allows your computer to switch to different modes, thus providing you with customized experiences during operations.

### Operation of the Power Control Switch

The Power Control Switch function supports three operating modes: **Auto**, **Turbo** and **Cool**. System resources are optimized by toggling between those three different modes. Different modes are used for different applications.

In the **Auto** and **Cool** mode, computer will boot up at rapid speed; In the **Turbo** mode, computer will boot up at ultra speed.

- Switch different mode by toggling the power control switch



- Press the Power Control Switch indicator ON/OFF to open the indicator under the front panel and indicate the different **lighting effects in each mode.**



- Display the main screen of the software

Double click the Power Control Switch icon in the Quick Launch bar.

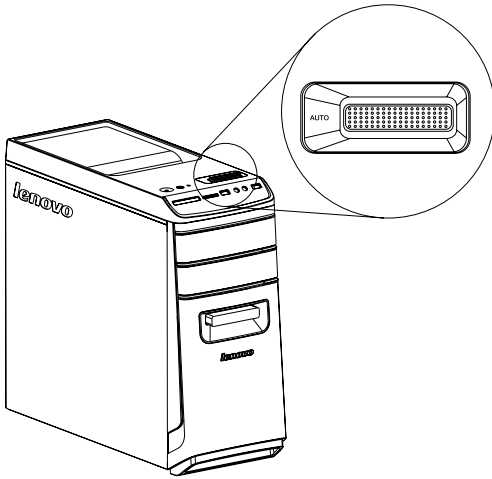


**Open the running status for each component under the Mode Switch:**

**CPU** — Show the percentage of the current CPU clock frequency against the nominal maximal CPU clock frequency.

**Boot** — The status of the computer startup speed.





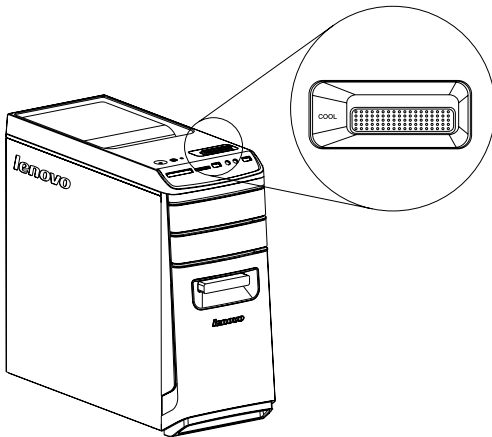
## AUTO

Auto adjust the system CPU clock frequency and running speed. Turn the Power Control Switch knob to the Auto position to enable this mode.



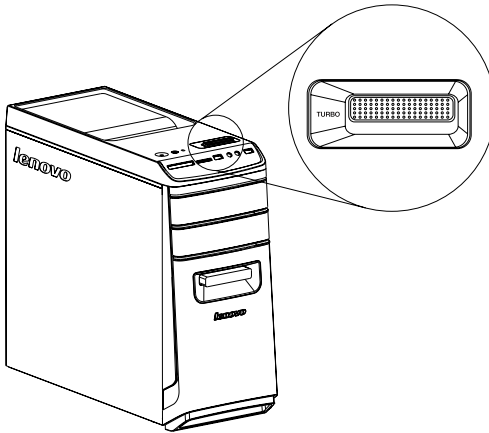
## Note:

The numeric values may vary because each model is configured differently.



## COOL

The CPU runs at low frequency. The system consumes minimum power. Turn the Power Control Switch knob to the Cool position to enable this mode.



**Note:**

The numeric values may vary because each model is configured differently.

**TURBO**

The CPU runs at full speed. The system achieves its optimal performance. Turn the Power Control Switch knob to the Turbo position to enable this mode.

**Note:**

The numeric values may vary because each model is configured differently.



**Notes:**

- When you are running system-intensive games or other programs that consume a high proportion of the system resources, you should choose Turbo mode. This will allow you to achieve optimal performance.
- After unplugging and reconnecting the power cord to the outlet, the computer cannot boot up at ultra speed in Turbo mode. In order to keep ultra speed during the boot up, the computer must always keep connecting the outlet.

# 2

Chapter

## Using the Rescue System

### This chapter contains the following topics:

- OneKey Recovery
- Driver and Application Installation
- System Setup
- System Backup
- System Recovery
- Create Recovery Disc



**Attention:** Using this program will result in loss of data.

- You can restore the C: drive of the computer to factory default settings or to the last system backup status using **OneKey Recovery**. If you do this, all of the existing data on drive C: will be lost, but the content and format of the other partitions of the hard disk drive will remain unchanged.
- If you want to install an operating system and back it up with **OneKey Recovery**, you must format the C: partition in **NTFS** format and install the operating system on the C: partition. Otherwise, the **OneKey Recovery** system cannot run.

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## Note about the service partition:

The files and relevant data used by the rescue system are saved in the service partition. Deleting this partition will make the rescue system unusable. For more detailed information, see the following instructions:

By selecting **Control Panel** → **Administrative Tools** → **Computer Management** → **Disk Management**, you can see the service partition, which must not be deleted.


 **Note:** The recovery files and relevant data used by the rescue system are saved in the service partition. If the service partition is deleted or damaged by someone other than authorized Lenovo service personnel, Lenovo will not be liable for any losses arising therefrom in any way.

## 2.1 OneKey Recovery

**OneKey Recovery** is an easy-to-use application. You can use it to restore your computer to the system default or to a previously backed up state.

### Detailed Operation Procedure

1. Repeatedly press and release the **F2** key once turning on the computer until the **Lenovo Rescue System** open, then select **OneKey Recovery**.

 **Note:** System Recovery will overwrite all of the data on the C: drive. To prevent loss of data, be sure to back up relevant data before performing system recovery.

2. Follow the on-screen instructions to select the backup task you want to restore from and the disk where you want to install the operating system, then press **Next** to start the restore.
3. Please wait during the process of system recovery. Do not interrupt the operation during the recovery process.
4. After the system is recovered successfully, the software will prompt you to restart the computer. Restart the computer and start the operating system.

## 2.2 Driver and Application Installation

The **Driver and Application Installation** function in the rescue system provides a way for the user to conveniently reinstall all of the Lenovo applications and drivers that were shipped with your Lenovo hardware.

## Method 1: Automatic Installation

Repeatedly press and release the **F2** key once turning on the computer until the **Lenovo Rescue System** open, then select **Drivers and Application Installation**.

Follow the on-screen prompts to install the Lenovo drivers and applications. Click **Install** to start installing the **Lenovo Drivers and Application Installation** software.

The system will restart. After the system has restarted, the installation process will continue until it has completed.

## Method 2: Manual Installation

In the Windows system, Click **Start** → **All Programs** → **Lenovo** → **Lenovo Drivers and Application Installation**.

After starting the procedure, install all the drivers and software manually by following the prompts.

### Notes:

1. Do not install software which is already installed on the computer.
2. Make sure that the Drivers and Application Installation software has been automatically installed before starting the operating system. The manual installation function can only be used after the software has been installed.

## 2.3 System Setup

**System Setup** configures the network configuration for the Lenovo Rescue System to ensure your Rescue System can connect to internet. In addition, System Setup sets and manages all passwords for the Lenovo Rescue system.

### 2.3.1 Launch

Repeatedly press and release the **F2** key once turning on the computer until the **Lenovo Rescue System** open, then select **System Setup**.

### 2.3.2 Network Settings

Depending on the network access mode of the computer, select “ADSL” or “LAN Connection” in the network connection modes.

1. If you select “ADSL” input the username and password of the ADSL connection.

2. If you select “LAN connection” configure the IP address and proxy server of the LAN.

### 2.3.3 Password Management

**Password Management** allows you to set and manage the password for Lenovo Rescue System.

The default password is blank.

Set a password when you access **Password Management** for the first time. If you don't want to set a password, access the system directly and operate it accordingly.

## 2.4 System Backup

This backs up your system partition to an image file. In case of a system failure, you can restore your system from this image file.

In the Windows system, click **Start** → **All Programs** → **Lenovo** → **Lenovo Rescue System**.

After starting Rescue System, click **System Backup** to back up your system partition by following the prompts.

## 2.5 System Recovery

Reboot your computer into the system recovery environment. You can choose to restore to a system backup point or the initial state (factory default settings).

## 2.6 Create Recovery Disc

Create a bootable recovery disc from the current system. These recovery discs are used to boot your computer and will guide you through the entire restoration process.

In the Windows system, click **Start** → **All Programs** → **Lenovo** → **Lenovo Rescue System**.

After starting Rescue System, click **Create Recovery Disc** to create a bootable recovery disc from the current system.

Follow the on-screen prompts to create recovery discs.

# 3

Chapter

## Troubleshooting and Confirming Setup

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### This chapter contains the following topics:

- Troubleshooting and Problem Resolution

**!** **Note:** The description of the TV tuner card in this manual is only used for the machines which have the TV tuner card. It does not apply to those machines that do not have a TV tuner card.

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## Solving Problems

### Follow these tips when troubleshooting your computer:

- If you added or removed a part before the problem started, review the installation procedures to ensure that the part is correctly installed.
- If a peripheral device does not work, ensure that the device is properly connected.
- If an error message appears on the screen, write down the exact message. This message may help support personnel diagnose and fix the problem(s).
- If an error message occurs in a program, see the program's documentation.

 **Note:** The procedures in this document were written for the Windows default view, so they may not apply if you set your Lenovo® computer to the Windows Classic view.

### 3.1 Troubleshooting Display Problems

**Problem:** Blank screen or no image is displayed on the monitor.

#### Troubleshooting and problem resolution:

1. Check to see if the monitor has been turned on; if not, press the Power button.
2. Check to see if the monitor power cord is loose; if so, plug the power cord securely into the monitor.
3. Check to see if the signal cable to the monitor is securely connected to the connector on the computer graphics card; if not, shut down the computer then connect the signal cable of the monitor securely to the connector on the computer graphics card.

**Problem:** You need to change the display property settings.

#### Setting display background and icon properties:

1. Right-click the desktop anywhere except over an icon, then select Personalize from the pop-up menu.
2. From here, select the appropriate options to:
  - Change the desktop background
  - Select a screen saver
  - Select colors and appearance options for icons and text
  - Set resolution and colors in the Display Settings options

**Problem:** Ripple on screen.

**Troubleshooting and problem resolution:**

1. Check to see if any of the following devices are located less than one meter from the computer: refrigerators, electric fans, electric dryers, UPS systems, regulators, fluorescent lamps or other computers that may be generating magnetic interference.
2. Move any interfering devices away from the computer.
3. If the problem persists, contact Lenovo Service.

## 3.2 Troubleshooting Audio Problems

**Problem:** No sound from the integrated speakers.

**Troubleshooting and problem resolution:**

- Adjust the Windows volume control — double-click the speaker icon in the lower-right corner of your screen. Ensure that the volume is turned up and the sound is not muted. Adjust the volume, bass, or treble controls to eliminate distortion.
- Reinstall the audio driver.
- Disconnect any headphones from the headphone connector — sound from the speakers is automatically disabled when headphones are connected to the computer's side-panel headphone connector.

**Problem:** No sound from headphones.

**Troubleshooting and problem resolution:**

- Check the headphone cable connection — ensure that the headphone cable is securely inserted into the headphone connector.
- Adjust the Windows volume control — click or double-click the speaker icon in the lower-right corner of your screen. Ensure that the volume is turned up and the sound is not muted.

## 3.3 Troubleshooting Software Problems

**Problem:** You are unable exit a running program normally.

**Troubleshooting and problem resolution:**

1. Open the **Task Manager** window by pressing **Ctrl, Alt** and **Delete** at the same time.
2. Select the **Application** tab, select the problem program, then click the **End Task** button.

**Problem:** You need to install or uninstall a program.

**Problem resolution:**

***During installation*** never abort the install process by powering the system off or through other drastic means. This can cause system program disorder or even failure during system initialization.

***During the uninstall process***, never directly delete the files or folders. This is harmful to the system, and might cause a system-wide malfunction.

Use the following procedure to properly uninstall programs:

1. Back up all documents and system settings related to the program before removing it.
2. If the program has its own uninstaller, run it directly to uninstall the program.
3. If the program does not have its own uninstaller, then select Control Panel from the Start menu.
4. From the Control Panel, choose Programs and Functions.
5. Find the applicable program from the Programs and Functions dialog box and then select Uninstall/Modify.
6. Perform the instructions displayed to uninstall the software.

### **3.4 Troubleshooting Problems with Optical Drives and Hard Disks**

**Problem:** The Optical drive is unable to read a CD/DVD.

**Troubleshooting and problem resolution:**

1. Check to determine if there is an optical drive icon in the resource manager of the operating system. If not, restart your computer. If there is still no icon, contact Lenovo Service. Otherwise, continue with the next step of this procedure.
2. Confirm that the CD/DVD has been properly placed in the drive. If not, reload the CD or DVD. Otherwise, continue with the next step of this procedure.
3. Check the specifications that came with your computer to confirm that this optical drive is capable of reading this type of CD or DVD.
4. If the CD/DVD cannot be read, replace it with a known good CD/DVD such as one that was shipped with the computer.
5. If the known good CD cannot be read, visually check the operating side of the CD/DVD for defects.

**Problem:** The capacity of the hard disk, as indicated by the system, is less than the nominal capacity.

**Troubleshooting and problem resolution:** For computers equipped with the OneKey Recovery feature, the system recovery feature needs to occupy some hard disk space. This may account for the apparent hard disk capacity deficit.

**Further Technical Explanation:** The nominal capacity of the hard disk is expressed in the decimal system, 1000 bytes. But the actual hard disk capacity is expressed in the binary system as 1024 bytes (For example, the nominal capacity 1G is 1000M, while the actual capacity 1G is 1024M).

The capacity of the hard disk shown in Windows can be calculated according to the calculations in the following example:

The nominal capacity of the hard disk is 40G, while its actual capacity should be:  $40 \times 1000 \times 1000 \times 1000 / (1024 \times 1024 \times 1024) = 37\text{G}$ .

If the Service partition of 3G -  $3 \times 1000 \times 1000 \times 1000 / (1024 \times 1024 \times 1024) = 2.79\text{G}$  is subtracted, the capacity of the hard disk shown in the system can be obtained.

The capacity of the hard disk as calculated using this method may be slightly different from the actual capacity due to the rounding of totals.

### 3.5 Special considerations for troubleshooting Windows

Record the following information as it may be useful later when troubleshooting system problems:

1. The serial number of the software. The serial number was shipped with the computer and provided separately by the manufacturer. The Help Center is unable to retrieve this number.
2. The drivers for this computer model only support the Windows 7 system.
3. When you use the Windows Media Center to watch TV, be particularly attentive to the following:
  - In the following two situations, you must re-save a channel list:
    - a. When you change your TV signal from digital to analog, your saved channel list for digital TV is deleted. When you want to watch digital TV again, you must create and save a new channel list.
    - b. When you change your TV signal from analog to digital, your saved channel list for analog TV is deleted. When you want to watch analog

TV again, you must create and save a new channel list.

- You must set the TV tuner input signal to analog before you can watch Teletext programming.

## 3.6 Performing Daily Maintenance Tasks

### Cleaning the computer components

Because many of the computer components consist of sophisticated integrated circuit boards, it is very important to periodically clean the computer to prevent dust buildup. The cleaning supplies you need to clean the components include: a vacuum cleaner, a soft cotton cloth, clear water (preferably purified or distilled water) and cotton swabs.



**Attention:** Before you clean your computer, disconnect the computer from the electrical outlet. Clean your computer with a soft cloth dampened with water. Do not use liquid or aerosol cleaners, which may contain flammable substances.



**Note:** To avoid damaging the computer or display, do not spray cleaning solution directly onto the display. Only use products specifically designed for cleaning displays, and follow the instructions included with the product.

### The following are general methods for cleaning the components:

- You can use a soft cloth to remove dust on the surface of the computer, the monitor, the printer, the speakers and the mouse.
- You can use a vacuum cleaner to clean in otherwise inaccessible corners.
- To clean the keyboard thoroughly, shut down the computer and scrub it gently with a wet cloth. Do *not* use the keyboard until it is dry.

### Do not do any of the following:

- Allow water to enter the computer.
- Use a heavily dampened cloth.
- Spray water directly onto the surface of the monitor or inside the computer.

LCD monitors should be cleaned daily. Use a dry cloth to brush dust from the monitor and keyboard every day. Keep all surfaces clean and free of grease stains.

# 4

Chapter

## Hardware Replacement Guide

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### This chapter contains the following topics:

- Identifying internal components
- Identifying parts on the system board
- Removing the computer cover
- Removing the front bezel
- Replacing a memory module
- Replacing a hard disk drive
- Replacing an optical drive
- Replacing a graphics card
- Replacing the TV-Tuner card
- Replacing the keyboard and mouse

1


2

3


4

## Overview

This guide is intended to be used by customers who are replacing Customer Replaceable Units (CRUs) as well as trained service personnel who are replacing Field Replaceable Units (FRUs). In this guide, CRUs and FRUs will often be referred to as parts.

 **Note:** Trained service personnel should refer to the *Hardware Maintenance Manual (HMM)* for parts ordering information.

This guide does not include procedures for the replacement of all parts. It is expected that trained service personnel are already able to replace cables, switches, and certain mechanical parts without the need for step-by-step procedures.

 **Note:** Use only parts provided by Lenovo®.

The description of the TV-Tuner card in this manual applies only to computer models with a TV-Tuner card, and therefore does not apply to models without a TV-Tuner card.

This guide contains instructions for replacing the following parts:

- Memory modules
- Hard disk drive
- Optical disk drive
- Graphics card
- TV-Tuner card

## Safety information for replacing CRUs

Do not open your computer or attempt any repairs before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer. An electronic copy of the *Safety and Warranty Guide* can also be obtained online from the Lenovo® Support Web site at: <http://consumersupport.lenovo.com>.

## Additional information resources

The most up-to-date information for your computer is available online at: <http://consumersupport.lenovo.com>.

You can find the following information:

- Customer replacement unit removal and installation information
- Publications
- Troubleshooting information
- Parts information
- Links to other useful sources of information

## Tools required

To disassemble the computer, you will need the following tools:

- Wrist grounding strap and conductive mat for preventing electrostatic discharge
- Flat screwdriver
- Phillips screwdriver
- Hex screwdriver
- Plastic flat screwdriver
- Plastic tweezers



**Note:** The screws used for the different components vary in size. During the disassembly procedure, group the screws with their corresponding components to avoid a mismatch when replacing the components.



## Handling static-sensitive devices

Static electricity, although harmless to you, can seriously damage computer components.

When replacing a part, do not open the anti-static packaging containing the new part until the defective part has been removed from the computer and you are ready to install the new part.

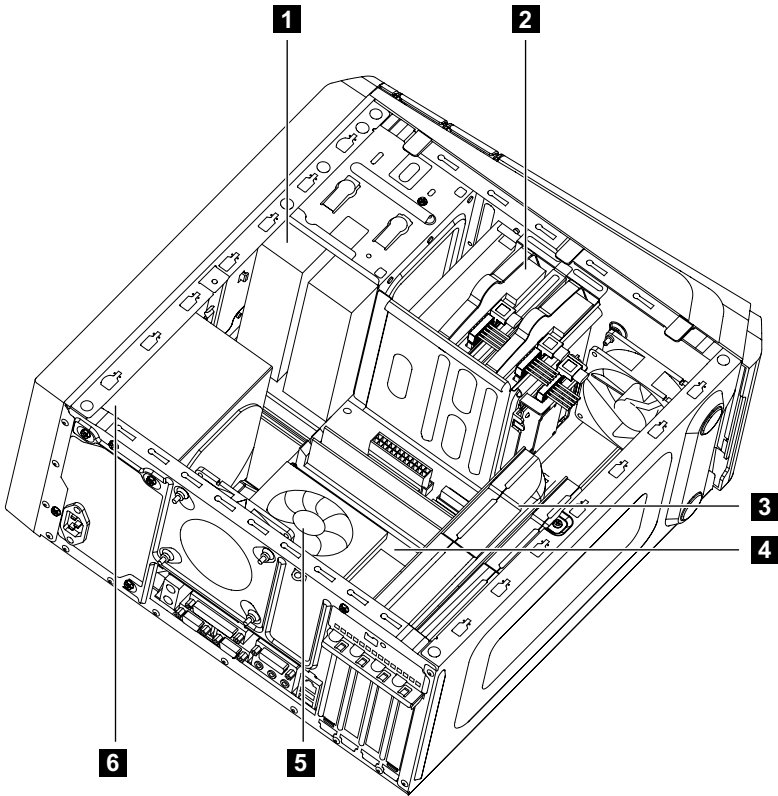
When handling parts and other computer components, the following precautions should be taken in order to avoid static electricity damage:

- Limit your movements, as movement can cause the build-up of static electricity.
- Always handle parts and other computer components with care, and handle adapters, memory modules, system boards, and microprocessors by their edges. Never touch any exposed circuitry.
- Prevent others from touching parts and other computer components.
- Before replacing a new part, first place the anti-static packaging containing the part against a metal expansion slot cover or other unpainted metal surface on the computer for at least two seconds. This will reduce static electricity in the package and your body.
- When possible, remove the new part from its anti-static packaging and install it directly into the computer without setting the part down. If this is not possible, place the part on top of its anti-static packaging on a smooth, flat surface before installing it.
- Do not place parts on the computer cover or other metal surface.

## 4.1 Locations

### 4.1.1 Identifying internal components

The following illustration shows the components inside your computer.



**1** Optical disk drive

**2** Hard disk drive

**3** Graphics card

**4** System board

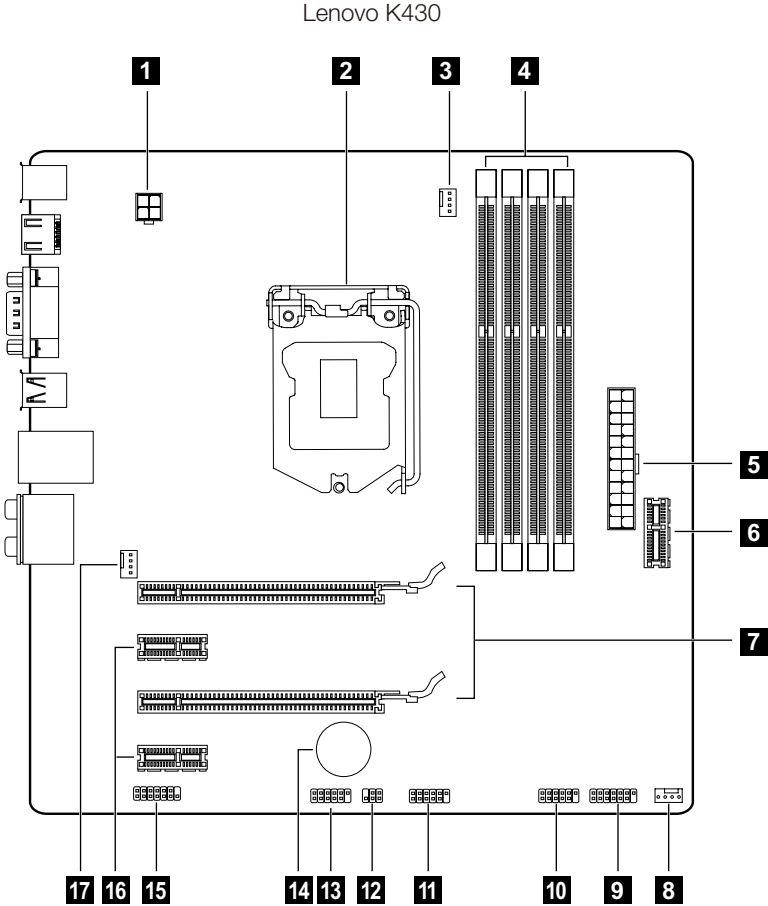
**5** System fan

**6** Power supply

## 4.1.2 Identifying parts on the system board

The system board (also known as the “mainboard” or “motherboard”) is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are factory-installed or that you can install later.

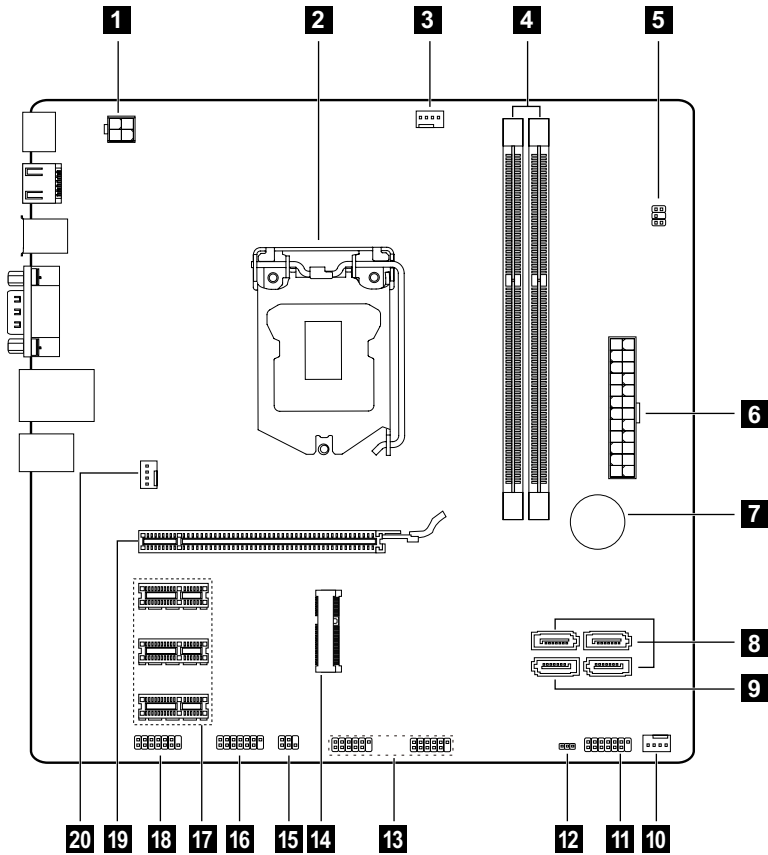
The following illustrations show the locations of the different parts on the system board.



- |                                             |                                       |
|---------------------------------------------|---------------------------------------|
| <b>1</b> 12V power connector                | <b>2</b> Microprocessor and heat sink |
| <b>3</b> Microprocessor fan header          | <b>4</b> Memory slots (4)             |
| <b>5</b> Power connector                    | <b>6</b> Front USB header             |
| <b>7</b> PCI express X 16 adapter slots (2) | <b>8</b> Power fan header             |

- 9** Front panel connector
- 10** Front USB connector
- 11** Front USB connector
- 12** Mode switch connector
- 13** Serial (COM2) connector
- 14** Battery
- 15** Front audio connector
- 16** PCI express X 1 adapter slots (2)
- 17** System fan header

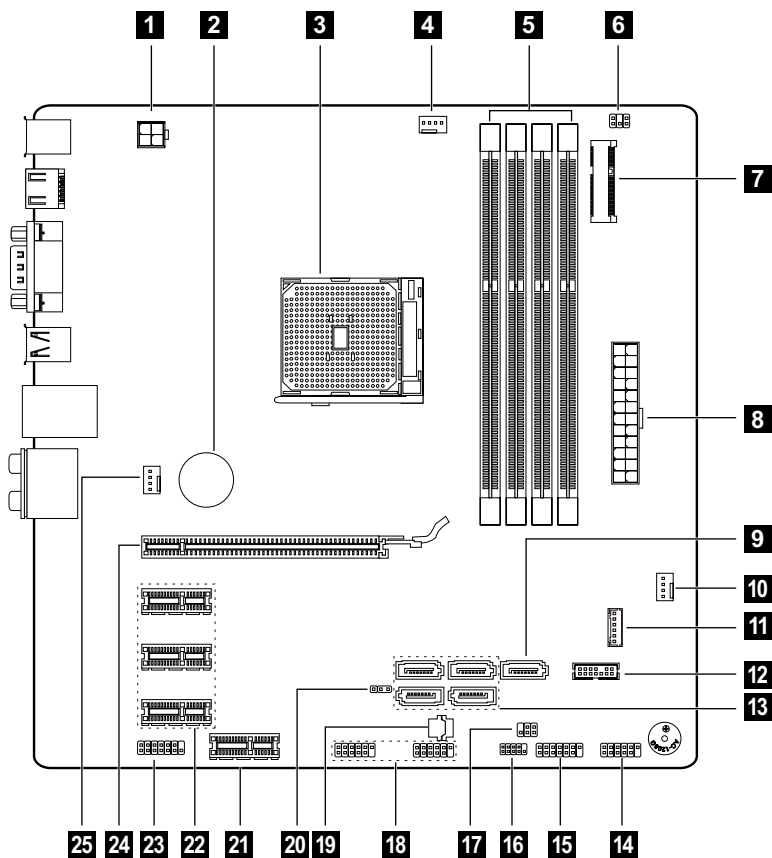
Lenovo K410



- 1** 12V power connector
- 2** Microprocessor and heat sink
- 3** Microprocessor fan header
- 4** Memory slots (2)
- 5** Thermal sensor header
- 6** Power connector
- 7** Battery
- 8** SATA connectors (3)

- 9** eSATA connector
- 11** Front panel connector
- 13** Front USB connectors (2)
- 15** Mode switch connector
- 17** PCI express X 1 adapter slots (3)
- 19** PCI express X 16 adapter slot
- 10** Power fan header
- 12** Clear CMOS jumper
- 14** Mini PCI-E slot
- 16** Serial (COM2) connector
- 18** Front audio connector
- 20** System fan header

Lenovo K415



- 1** 12V power connector
- 2** Battery
- 3** Microprocessor and heat sink
- 4** Microprocessor fan header
- 5** Memory slots (4)
- 6** Thermal sensor header

- |           |                                |           |                                   |
|-----------|--------------------------------|-----------|-----------------------------------|
| <b>7</b>  | Mini PCI-E slot                | <b>8</b>  | Power connector                   |
| <b>9</b>  | eSATA connector                | <b>10</b> | Power fan header                  |
| <b>11</b> | SSD power connector (Optional) | <b>12</b> | LPC debug connector               |
| <b>13</b> | SATA connectors (4)            | <b>14</b> | Serial (COM2) connector           |
| <b>15</b> | Front panel connector          | <b>16</b> | SPI debug connector               |
| <b>17</b> | Mode switch connector          | <b>18</b> | Front USB connector (2)           |
| <b>19</b> | ROM socket                     | <b>20</b> | Clear CMOS jumper                 |
| <b>21</b> | Front USB header               | <b>22</b> | PCI express X 1 adapter slots (3) |
| <b>23</b> | Front audio connector          | <b>24</b> | PCI express X 16 adapter slot     |
| <b>25</b> | System fan header              |           |                                   |

## 4.2 Replacing hardware



**Attention:** Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>.

### 4.2.1 General information

#### Pre-disassembly instructions

Before proceeding with the disassembly procedure, make sure that you do the following:

1. Turn off the power to the system and all peripherals.
2. Unplug all power and signal cables from the computer.
3. Place the system on a flat, stable surface.

## 4.2.2 Removing the computer cover

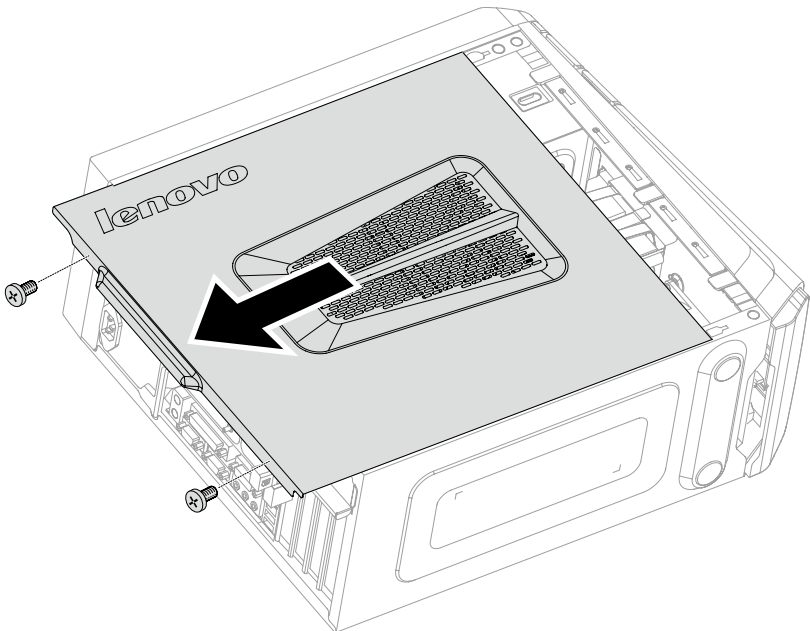


### Attention:

- Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.
- For this procedure, it helps to lay the computer on a flat, stable surface.

### To remove the computer cover:

1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the computer, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Locating connectors on the rear of the computer”.
4. Remove the two screws that secure the computer cover at the rear of the chassis.
5. Slide the computer cover out to remove it.

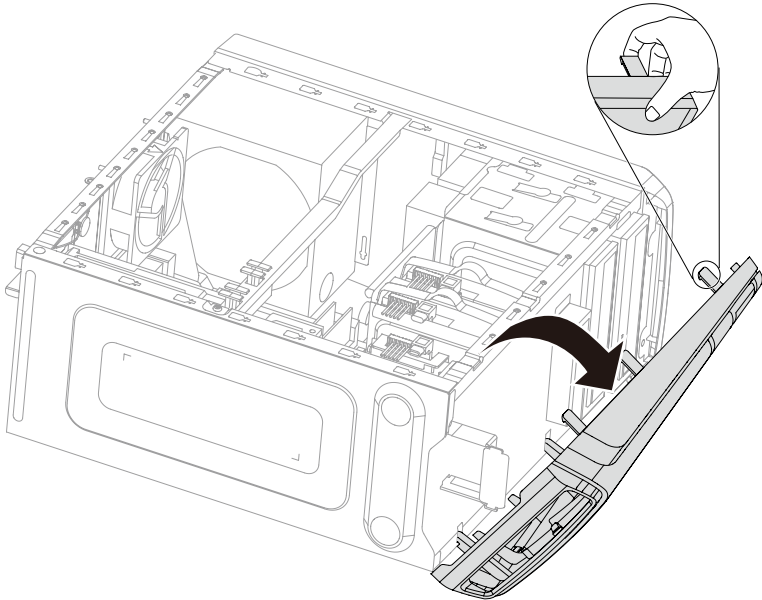


### 4.2.3 Removing the front bezel

**!** **Note:** For this procedure, it helps to lay the computer on a flat, stable surface.

#### To remove the front bezel:


1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Remove the front bezel by releasing the three plastic tabs inside the chassis and sliding the bezel out as shown.



3. To reattach the bezel, align the plastic tabs on the bottom of the bezel with the corresponding holes in the chassis, and then snap it into position.

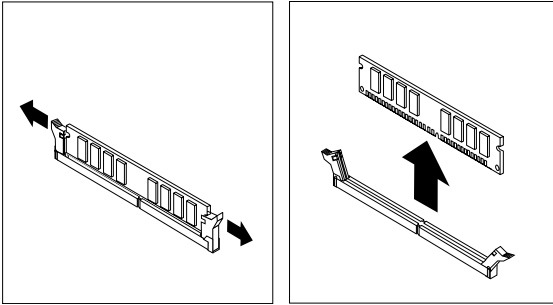


## 4.2.4 Replacing a memory module

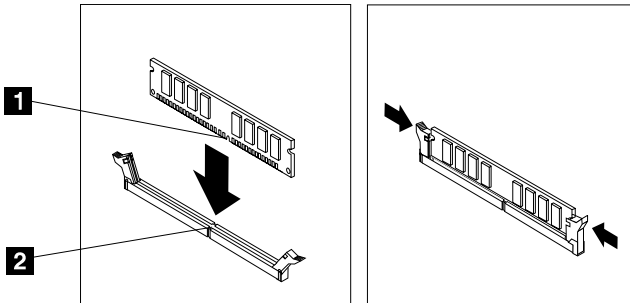
 **Note:** For this procedure, it helps to lay the computer on a flat, stable surface.

### To replace a memory module:

1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Locate the memory module connectors. Refer to “Locating components”.
3. Remove the memory module to be replaced by opening the retaining clips as shown.



4. Position the new memory module over the memory connector. Make sure that the notch **1** on the memory module aligns correctly with the connector key **2** on the system board. Push the memory module straight down into the connector until the retaining clips close.



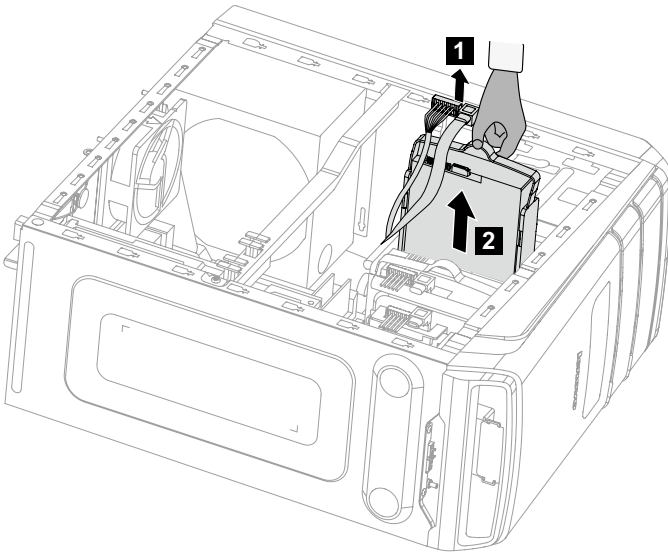
5. Reattach the computer cover.

## 4.2.5 Replacing a hard disk drive

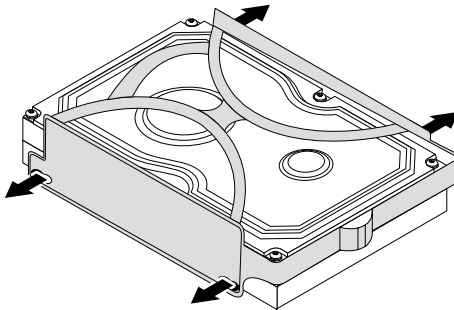
**!** **Note:** For this procedure, it helps to lay the computer on a flat, stable surface.

### To replace a hard disk drive:

1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Disconnect the data and power cables from the hard disk drive. **1**
3. Lift up the plastic handle and slide the hard disk drive out of the drive bay. **2**



4. Remove the hard disk drive from the plastic bracket as shown.



5. Line up the new hard disk drive with the plastic bracket and snap it into position.

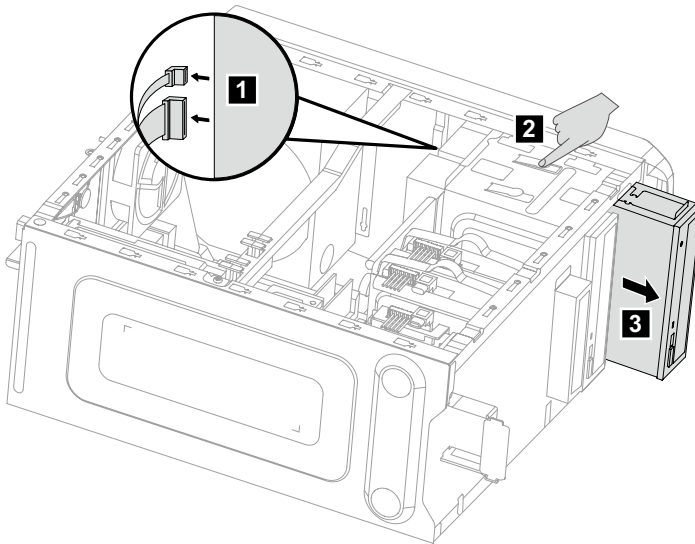
6. Slide the new hard disk drive into the drive bay and slide the drive bay into place.
7. Connect the power and signal cables to the new hard disk drive.
8. Reattach the computer cover.

## 4.2.6 Replacing an optical drive

**!** **Note:** For this procedure, it helps to lay the computer on a flat, stable surface.

### To replace an optical drive:

1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Remove the front bezel. Refer to “Removing the front bezel”.
3. Disconnect the data and power cables from the rear of the optical drive. **1**
4. Press the release button and push the optical drive straight out of the front of the chassis. **2 3**



5. Slide the new optical drive into the bay from the front until it snaps into position.
6. Connect the data and power cables to the new disk drive.
7. Reattach the front bezel and computer cover.

## 4.2.7 Replacing a graphics card

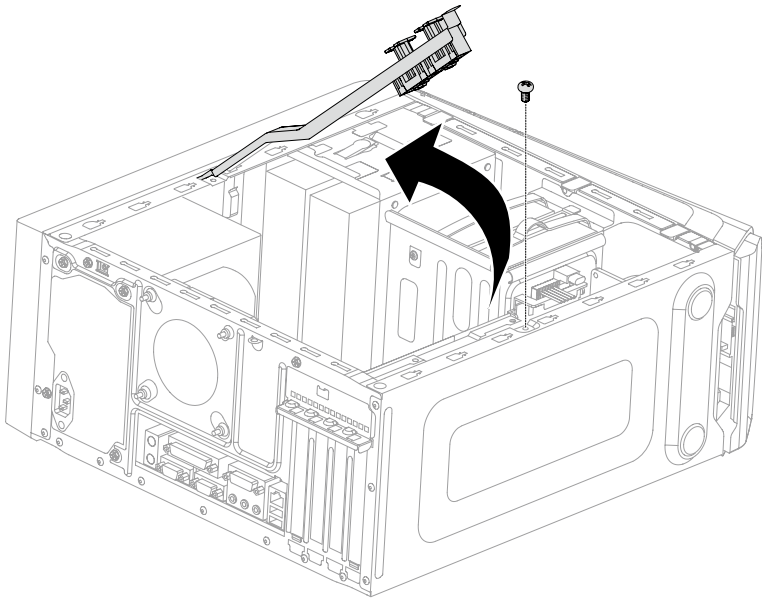
**!** **Note:** For this procedure, it helps to lay the computer on a flat, stable surface.

### To replace a graphics card:

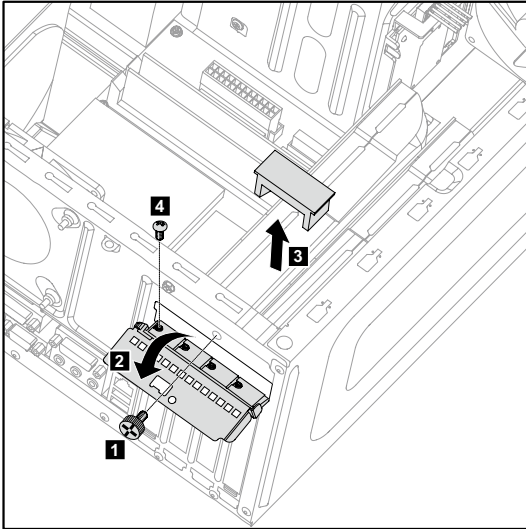
1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Follow the below steps to remove a graphics card:

**If your computer has a Duo-graphics cards installed, follow the steps below to replace it:**

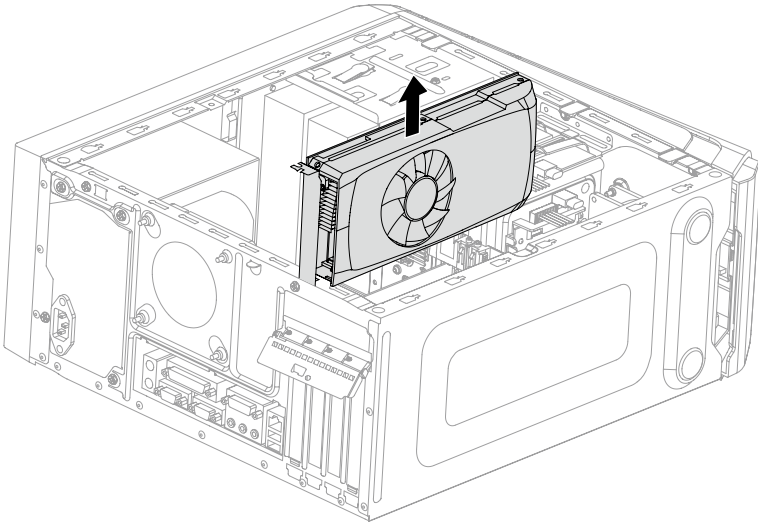
- a. Remove the screw that secures the Duo-graphics cards fixing bracket and lift the bracket up.



- b. Remove the screw that secures the graphics card latch to the chassis, open it, and remove the Duo-graphics cards connector. **1 2 3**
- c. Remove the screw that secures the graphics card to the chassis. **4**

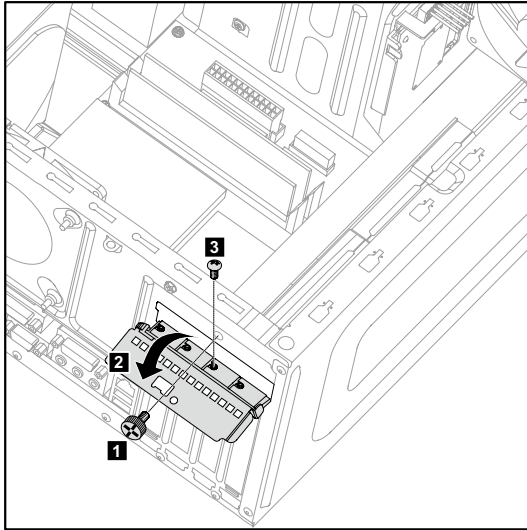


- d. Remove the graphics card by pulling it straight out of the connector.

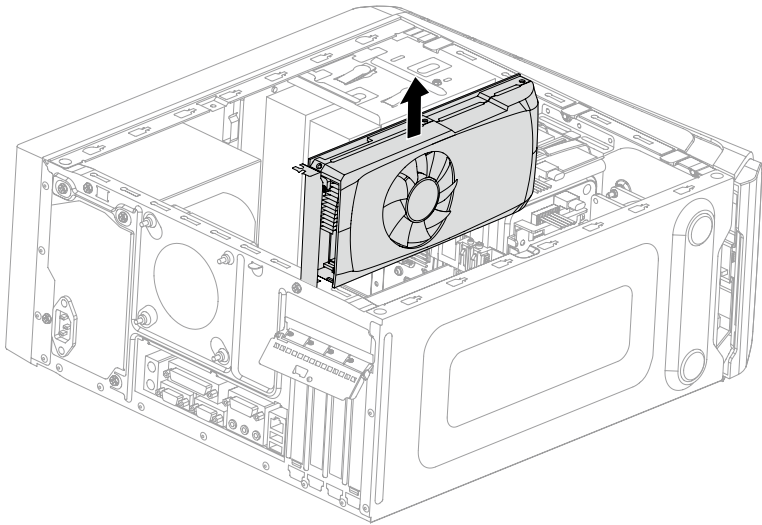


If your computer has a single graphics card installed, follow the steps below to replace it:

- a. Remove the screw that secures the graphics latch to the chassis and open it. **1 2**
- b. Remove the screw that secures the graphics card to the chassis. **3**



- c. Remove the graphics card by pulling it straight out of the connector.



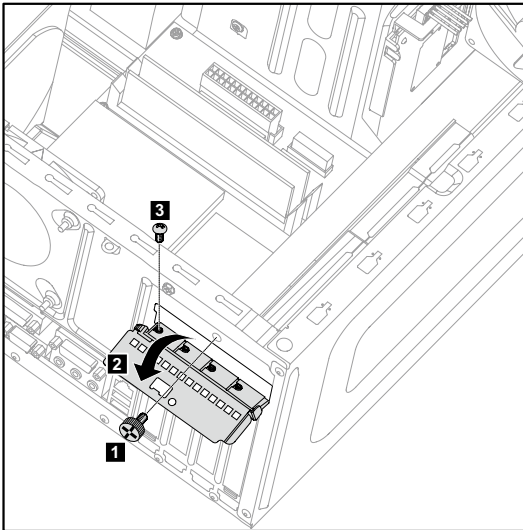
3. Install the new adapter into the same adapter connector and secure it to chassis with the screw.
4. Turn the graphics card latch to the closed position and secure it with the screw.
5. Connect the two graphics cards with the Duo-graphics cards connector and reattach the Duo-graphics cards fixing bracket to the chassis. (For models with Duo-graphics cards only)
6. Reattach the computer cover.

## 4.2.8 Replacing the TV-Tuner card

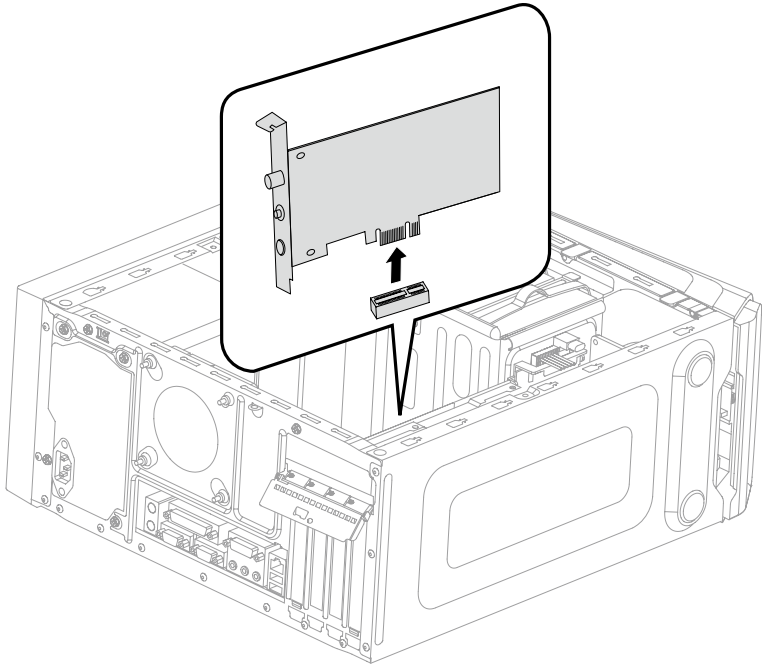
**!** **Note:** For this procedure, it helps to lay the computer on a flat, stable surface.

### To replace the TV-Tuner card:

1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Remove the screw that secures the graphics card latch to the chassis and open it. **1 2**
3. Remove the screw that secures the TV-tuner card to the chassis. **3**



4. Remove the TV-Tuner card by pulling it straight out of the connector.



5. Install the new TV-tuner into the same connector and secure it to chassis with the screw.
6. Turn the graphics card latch to the closed position and secure it with the screw.
7. Reattach the computer cover.



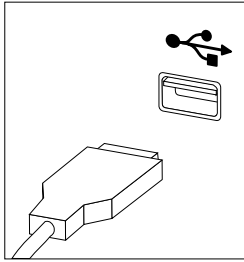
## 4.2.9 Replacing the keyboard and mouse



**Note:** Your keyboard will be connected to a USB connector at either front or the rear of the computer.

### To replace the keyboard:

1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the computer, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Locate the connector for the keyboard. Refer to “Front view of the chassis” and “Rear view of the chassis”.



4. Disconnect the defective keyboard cable from the computer and connect the new keyboard cable to the same connector.
5. The mouse can be replaced using the same method.

# Appendix.

## Declaration

Thank you for using Lenovo products.

Carefully read all documents shipped with your computer before you install and use the product for the first time. Lenovo is not responsible for any loss except when caused by installation and operations performed by Lenovo professional service personnel. You are responsible if you fail to operate the product according to instructions and requirements in the manuals included with your computer, or operate the product inappropriately.

This manual could include technical inaccuracies or typographical errors. Changes are made periodically to the information herein; these changes will be incorporated in new editions of the publication. To provide better service, Lenovo reserves the right to improve and/or modify the products and software programs described in the manuals included with your computer, and the content of the manual, at any time without additional notice.

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The software interface and function and hardware configuration described in the manuals included with your computer might not match exactly the actual configuration of the computer that you purchase. You are welcome to contact us about the manuals included with your computer. For the latest information or any questions or comments, contact or visit the Lenovo Web site:

Service Web site: <http://consumersupport.lenovo.com>

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## Energy Star Statement



ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy aimed at saving money and protecting the environment through energy efficient products and practices.

Lenovo is proud to offer our customers products with an ENERGY STAR compliant designation. The following machine types have been designed and tested to conform to the ENERGY STAR program requirement for computers at the time of manufacture. For more information about ENERGY STAR ratings for Lenovo computers, go to <http://www.lenovo.com>.

- 4744
- 4748
- 4743

By using ENERGY STAR compliant products and taking advantage of the power-management features of your computer, you reduce the consumption of electricity. Reduced electrical consumption contributes to potential financial savings, a cleaner environment, and the reduction of greenhouse gas emissions.

For more information about ENERGY STAR, go to: <http://www.energystar.gov>.

Lenovo encourages you to make efficient use of energy an integral part of your day-to-day operations. To help in this endeavor, Lenovo has preset the following power-management features to take effect when your computer has been inactive for a specified duration:

ENERGY STAR power-management features, by operating system.

<b>Microsoft Windows XP</b>	<b>Microsoft Windows Vista and Windows 7</b>
<ul style="list-style-type: none"> <li>• Turn off monitor: After 15 minutes</li> <li>• Turn off hard disk drives: Never</li> <li>• System standby: After 20 minutes</li> <li>• System hibernates: Never</li> </ul>	<p>Power plan: Balanced</p> <ul style="list-style-type: none"> <li>• Turn off the display: After 10 minutes</li> <li>• Put the computer to sleep: After 25 minutes</li> <li>• Advanced power settings:               <ul style="list-style-type: none"> <li>– Turn off hard disk drives: After 20 minutes</li> <li>– Hibernate: Never</li> </ul> </li> </ul>

To awaken your computer from a Sleep or System Standby mode, press any key on your keyboard. For more information about these settings, refer to your Windows Help and Support information system.

